



Communicator

The Monthly Newsletter of the Surrey Amateur Radio Club

February 2012

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Do It Better In Software

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Plus

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ve7sar.net





The Communicator



**SURREY
AMATEUR RADIO CLUB**

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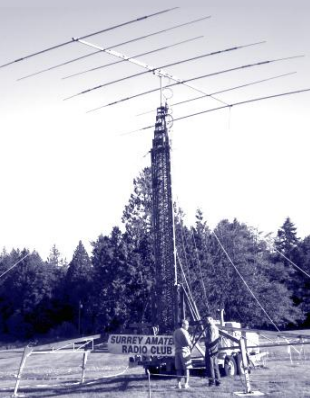
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VIA THE WEB
www.ve7sar.net

The **SARC Communicator** is published monthly for members of the Surrey Amateur Radio Club.

SARC maintains a website at www.ve7sar.net that includes club history, meetings, news and other information.



January Meeting Minutes Susan Eshelman VE7IIE—SARC Secretary

The meeting was convened at 7:05 p.m. by Vice President Bill Gipps VE7XS. Jinty Reid VA7JMR recorded the minutes.

INTRODUCTION & WELCOME

Bill VE7XS welcomed guests and an attendance list was circulated.

FINANCIAL REPORT

Treasurer Scott Hawrelak VE7HA provided a financial report, including accounts related to the December Christmas party. He noted that funds currently held in the gaming account will be used for installation of the new repeater. Bill VE7XS mentioned that RAC can now pay up to \$5 million to members of RAC or affiliated clubs for amateur radio liability. Scott VE7HA is again taking orders for SARC name badges. Cost is \$10, in advance.

HAM CLASS

Gary Skett VE7AS reported on the upcoming Basic Ham class, running

from January 19th to March 15th, with the Newbie Seminar on March 24th. Cost is \$120, which includes membership in SARC and a textbook. Registration can be done right up to the day of class.

KIT PROJECT

Gary VE7AS reported on the first kit project, which will involve construction of kits and demonstrating them. On completion of the project, participants can be reimbursed \$50. Funds available for this project are currently capped at \$500. Invoices are required for reimbursement. The current project is constructing an electronic keyer kit. The gadget has 5-channel memory.

SEPAR REPORT

Kelvin Hall VA7KPH, the SEPAR Coordinator, gave an update on SEPAR activities. He informed members that on Thursday, January 19th, SEPAR will be having

CLUB EXECUTIVE 2011-2012

PRESIDENT

John Brodie VA7XB

VICE PRESIDENT

Bill Gipps VE7XS

SECRETARY

Susan Eshelman VE7IIE

TREASURER

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George Merchant
VE7QH (Repeaters)

Bill Little VA7ZBL
(Membership)

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	SEPARS Net	SARC Net
1st Tuesday	Drew VA7DRW Jay VE7OFH Standby	Drew VA7DRW
2nd Tuesday	Dixie VA7DIX Alan VA7BIT Standby	Alan VA7BIT
3rd Tuesday	Rob VE7CZV	John VA7XB
4th Tuesday	Bill VE7XS Dixie VA7DIX Standby	Anton VE7SSD
5th Tuesday	Jinty VA7JMK	Bill VE7XS
Want a turn at Net Control? Contact the Net Manager ve7ti @ separs.net		

SARC hosts an Amateur Radio net each Tuesday evening at 8 PM. Please tune in to the VE7RSC repeater at 147.360 MHz (+600 KHz) Tone=110.9, (optional Tone Squelch 110.9) also accessible on IRLP node 1980 and Echo-link node 496228. On UHF we operate a repeater on 443.775MHz (+5Mhz) Tone=110.9 Coming soon, a repeater at 224.000MHz (-1.6MHz).

their first workshop for 2012, being held at 13569 - 76th Ave, Surrey. The topic will be 'Emergency Response and Personal Preparedness', and will guide responders in how to ensure their own families' safety before responding to others. He also informed members that the new Mobile Command Post trailer has now been spray-foam painted and just needs furniture. It will hold 4 people comfortably.

NEW BUSINESS

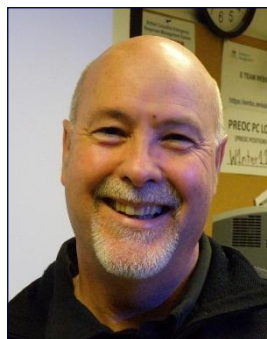
Kjeld Frederiksen VE7GP informed members that he has been a Ham for 30 years and most of that time a member of SARC. He talked about a Danish Ham Trip to the Northwest Passage being undertaken by Kirsten Thomsen and Kim Bork Mathiesen, with whom Kjeld has kept in touch for over 20 years. The couple have a [webpage](#), but it is in Danish. They can be contacted in English at kk.sol@sol.dk, for anyone who is interested in communicating with them during their trip. Kjeld will keep members updated.

Al Roberts VA7AGR is the Chair person for Marshalling at the upcoming BC Summer Games in Surrey, and asked if SARC members would be interested in helping at this event with communication. Some members expressed interest. The event will be from July 17th to 22nd, with an additional event on April 19th, with the Games Flame. Al will keep us updated.

Bill Gipps VE7XS announced the upcoming BC QSO Party, which has a new sponsor -- Orca DXCC. The club contest is on February 4th from 8 am to 8 pm. The contest helps the world come to BC.

FEATURE PRESENTATION

Gary Skett VE7AS introduced the guest speaker, Dr. Mark Frobb VE7TLZ (MD, CCFP, CAFCI). Mark is a deep sea sailor and adventurer, published author, and principal of the Ocean Park Chronic Back Pain Clinic. He is a Basic with Honours Ham Operator.



Mark talked about his recent 2011 round trip sailing adventure to Maui from Vancouver - with particular focus on the use of Ham Radio while sailing on the open ocean.

The meeting was adjourned at 8:55 p.m. The next meeting will be held on February 8th, 2012.

Mark has a blog you may be interested in following. The URL of the blog is:

http://www.sailblogs.com/member/telltales_hawaii/

Next SARC Meeting Wednesday, February 8, 2012

The next meeting of the Surrey Amateur Radio Club will feature the first of an anticipated series of presentations on Software Defined Radio. Guest Speaker Alex Schwarz VE7DXW on the MDSR Project. See the feature article on page 4. Hope to see you there!

DOWN THE LOG...

SARC Monthly Meetings

2nd Wednesday (Sept-Jun)
1900 hrs local at the Emergency Management BC PREOC,
14275 96th Avenue, Surrey, BC

Weekly Club Breakfast

Friday at 0830 local
ABC Country Restaurant at
600 - 7380 King George Blvd.
Surrey

SARC Net

Tuesday at 2000 hrs local
on 147.360 MHz (+) Tone=110.9

SEPARS Net

Tuesday at 19:30 hrs local
on 147.360 MHz (+) Tone=110.9

Announcements & News

SEPARS Monthly Workshop
Third Thursday, 1900-2130 local
Rm. 214, 13569 - 76th Avenue,
Surrey.

SEPARS Training

Fourth Saturday, 0830 local,
Firehall #1, 88 & 132nd Street,
Surrey

On the Web ve7sar.net

Between newsletters, watch your e-mail for announcements of events, monthly meetings and training opportunities. These announcements may also be found on our web page.

Twitter
[@ve7sar](https://twitter.com/ve7sar)

SDR

Do It Better In Software

Our next couple of general monthly meetings are scheduled to feature Software Defined Radio (SDR). A software-defined radio system, or SDR, is a radio communication system where components that have been typically implemented in hardware (e.g. mixers, filters, amplifiers, modulators/demodulators, detectors, etc.) are instead implemented by means of software on a connected personal computer or embedded computing devices. While the concept of SDR is not new, the rapidly evolving capabilities of digital electronics render practical many processes which used to be only theoretically possible.

A basic SDR system may consist of a personal computer equipped with a sound card, or other analog-to-digital converter, preceded by some form of RF front end. Significant amounts of signal processing are handed over to the general-purpose processor, rather than being done in special-purpose hardware. Such a design produces a radio which can receive and transmit widely different radio protocols (sometimes referred to as waveforms) based solely on the software used.

The advantages of a SDR over a traditional analog radio, a hybrid DSP/analog radio or "firmware defined radio" are many. Versatility, flexibility and immunity to obsolescence are just a few of the inherent characteristics of fully software defined radios.

Software radios have significant utility for the military and cell phone services, both of which must serve a wide variety of changing radio protocols in real time.

In the long term, software-defined radios are expected by proponents like the [SDRForum](#) (now The Wireless Innovation Forum) to become the dominant technology in radio communications.

Amateur Radio Use

A typical amateur software radio uses a direct conversion receiver. The receiver performance of this line of SDRs is directly related to the dynamic range of the analog-to-digital converters (ADCs) utilized. Radio frequency signals are down converted to the audio frequency band, which is sampled by a high

performance audio frequency ADC. First generation SDRs used a PC sound card to provide ADC functionality. The newer software defined radios use embedded high performance ADCs that provide higher dynamic range and are more resistant to noise and RF interference.

A fast PC performs the digital signal processing (DSP) operations using software specific for the radio hardware. The SDR

software performs all of the demodulation, filtering (both radio frequency and audio frequency), signal enhancement (equalization and binaural presentation). Uses include every common amateur modulation: Morse code, single sideband modulation, frequency modulation, amplitude modulation, and a variety of digital modes such as radioteletype, slow-scan television, and packet radio. Amateurs also experiment with new modulation methods: for instance, the DREAM open-source project decodes the COFDM technique used by Digital Radio Mondiale.

More recently, the GNU Radio using primarily the Universal Software Radio Peripheral (USRP) uses a USB 2.0 interface, an FPGA, and a high-speed set of analog-to-digital and digital-to-analog converters, combined with reconfigurable free software. Its sampling and synthesis bandwidth is a thousand times that of PC sound cards, which enables wideband operation.



What's Out There?

While this will not be a complete list of available SDR radios, one of the best known of the SDRs on the market targeted at Amateurs is made by a US company [Flex Radio Systems](#) based in Texas. Flex radios are fully software defined radio. Flex offers several transceivers, two of which require a suitable computer and one, the Flex 5000, with it's own computer built-in.



These radios are driven by specialized software, in this case, [FlexRadio's PowerSDR software](#). The software provides all of the radio functions by means of screen buttons. Tuning is done in several ways, including the use of a mouse or, for the die-hards that just need to have a dial, an external USB connected tuning knob.



Independent reviewers have favourably compared Flex 3000 and 5000 performance to the best brand name conventional transceivers available.

Perseus



There is less information available on the Internet about the [Perseus](#) line. The Microtelecom Perseus is a software defined VLF-LF-MF-HF receiver (only) based on direct sampling digital architecture. The Perseus is a

robust, powerful receiver and it's performance (with a good antenna) is on par with high end professional receivers.

It originates in Italy. The new V4.0b software version allows connecting to remote Perseus receivers through any TCP/IP connection.

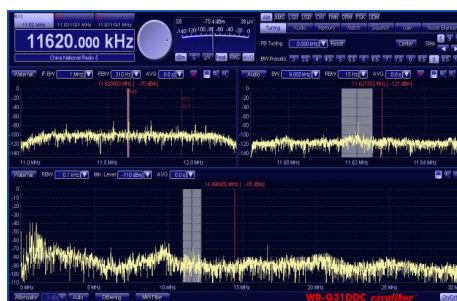
WinRadio

The [WinRADiO](#) is a high-performance, relatively low-cost, direct-sampling, software-defined, shortwave receiver (only) with a frequency range from 9 kHz to 50 MHz. It includes a real-time 50 MHz-wide spectrum analyzer and 2 MHz-wide instantaneous bandwidth available for recording, demodulation and further digital processing.

The receiver's superior performance results from its innovative, direct-sampling, digital down-converter architecture along with the use of



leading-edge components and design concepts. These all result in a very high IP3, wide dynamic range, excellent sensitivity, selectivity and tuning accuracy.



RFspace

The [RFspace SDR-14](#) is a 14-bit software defined radio receiver (only). It offers a broad range of spectrum analyzer and demodulation capabilities. Using a USB interface, all of the demod and spectral functions are done on the PC side. The SDR-14 is USB 2.0 'Full Speed' and is also fully compatible with USB 1.1.



The SDR-14 also supports high resolution spectral captures using up to 262144 point FFTs. The maximum spectral display width is 30 MHz simultaneously.

One of the most exciting features of the SDR-14 is the ability to record band segments of any band to hard drive in real time. This is done at a rate of 52GB/day for a 150 kHz wide segment. The stored file contains everything that happened in that segment of the band for the duration of the recording. The fidelity of the file is superb with over 96dB of dynamic range. The recording can be played back at any time with full

(Continued on page 8)



The Contest Contender

Fred Orsetti VE7IO & Jim Smith VE7FO

NAQP SSB Contest

January 14th, was the start of the North American QSO Party, an excellent and fun SSB event. The start was at 1800Z Saturday and it concluded at 0600Z Sunday. Yep, only 12 hours long, and single operator entries can only play for 10 hours max. Maximum power allowed is 100 watts, no big amps. The exchange is your name and state or province and the primary object is to work as many other North American stations as possible.

For those interested, the full rules are at ncjweb.com/naqprules.php.

Our contest group operators worked a total of 9.5 hrs out of a possible 12 with 259 Q's, 107 mults and 27,713 points. Several of the operators have now become comfortable in the "running" mode and this is a major step up.

We introduced .wav files to save the vocal cords and generally speaking they were successful but we have some fine tuning to do with the wav files to give them a bit more punch.

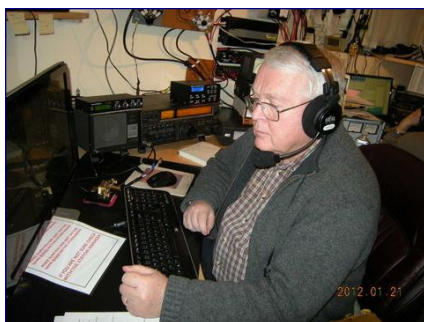
In 2012 NAQP SSB we made 259 contacts in 9½ hours with 2 HF Op positions. That works out to an average of 27.26 contacts per hour or about 13½ contacts per hour per op position.

In 2011 Field Day we made 779 contacts over the 24 hour period with 3 HF Op Positions, 1 VHF/UHF and 1 GOTA. That works out to an average of 32½ contacts per hour. If we ignore the V/U and GOTA positions, that works out to an average of about 11 contacts per hour per op position.

If we extrapolate these results to 3 op positions and 24 hours we end up with 980 contacts compared to 779 on FD.

Of course, conditions were different on FD as were the antennas, plus there were some experienced contest ops on FD which there weren't in NAQP SSB so you can't put too much faith in the extrapolated results.

Still, they look very promising and we're making progress.



SARC Contest Group operators participating in the NAQP SSB Contest on the weekend of January 21, 2011



Radio-Active Susan Eshelman VE7IIE

One of the most active and well respected members of the SARC community is our current club Vice President, Bill Gipps VE7XS. Bill's contribution to Amateur Radio is felt both at the local level and nationally, in his role as RAC Regional Director for British Columbia/Yukon.

Bill's interest in ham radio began at age 14. While attending boarding school, Bill got around the monthly restriction on phone calls home by getting a ham operator from Kemano to patch calls through for him. That early lesson in the value of ham radio wasn't forgotten and in 1990, Bill pursued his own ham license.

Balancing a busy professional life as a management consultant with his equally consuming Amateur Radio hobby, Bill manages to accomplish great things in both worlds. After completing a particularly demanding project rescue for a client in 2008, VE7XS took a much needed solo vacation to Belize. This 'quiet holiday' proved to be a major milestone in Bill's ham career.

In order to travel light, Bill made arrangements to rent an entire ham station in Belize for the week. Assuming he'd have to rely on his CW skills, and expecting to work a few hundred contacts from Belize, Bill was amazed to find himself on the right side of a DX pile-up that just wouldn't quit. Taking quick breaks for sleep, food and 'tropical refreshment', Bill worked 4,200 contacts in 7 days. The Belize holiday was a huge inspiration. Bitten by the DX bug, he came home determined to build his own first-class station... and that's precisely what he did.

Anyone who's had the pleasure of visiting VE7XS's rural station, affectionately referred to as 'The Farm', will understand just how big the Belize bug was that bit Bill. Also dubbed 'The Project' (because it's never going to be done), Bill and friends have made tremendous progress in establishing a full-scale ham station. Situated in a beautiful and serene rural setting, local wildlife no doubt look on in amazement at the growing cluster of steel containers that house the operation, and the many antennas being raised.



Bill describes The Project site as a phenomenal environment for radio because it's exceptionally free of noise. With the help of other local hams who have also put significant time and effort into the operation, and with the help of his very supportive wife, Judy, Bill continues to grow The Project. He now has plans for a large telescoping tower. His end game is a highly efficient station that is completely remote controlled - the ultimate 'field office'.

With a full schedule of professional duties and ongoing work at the Farm, Bill also finds time to serve the ham community at the national level, as a RAC Director.

Holding the position for the last three years, he assists RAC in their ongoing efforts to control costs, drive membership, and stand as a strong advocate for Canadian Amateur Radio. The future looks bright for protecting band space, and Bill encourages everyone to support their national organization, which is the sole representative for all ham operators in Canada.

Focus on individual members of the ham community is what Bill enjoys most about the hobby - it's all about the people. He loves the diversity found in the ham community: 'tinker, tailor, soldier, spy'... white collar, blue collar and everything in between... Bill loves having an opportunity to meet people of all ages, from all walks of life. He sees

ham radio as a great equalizer that brings all types of people together to share a love of radio.

At the upcoming monthly meeting on February 8th, SARC members and guests will have an opportunity to meet Bill and hear his presentation on Flex Radio. He'll focus on some of the do's and don'ts related to software-defined radio (SDR), how to avoid the complexities of software and get on the air. He'll also talk about the visual side of Flex, and the benefits of precision tuning you can enjoy with a pan-adaptor.

In the future, Bill hopes to continue developing his radio skills, including CW and conquering the challenges of Mobile HF. He looks forward to more DX trips, and continuing to work with friends and associates in the British Columbia/Yukon ham radio community.



SEPARS Report Kelvin Hall VA7KPH

SEPAR is taking on the task of outfitting the new Communications Trailer and exercising it within the realm of Emergency Communications Response.

We will continue to educate the younger groups at local schools and libraries under the guidance of Fred Orsetti and Marcy Louie and their numerous volunteers.

During 2012 SEPAR will take a more in depth look at what hazards exist and how SEPAR can respond. Part of the response is having an excellent knowledge of the SEPAR equipment, where it is, how to set it up, how to operate it and how to put it to bed for the next emergency. A recent workshop saw eighteen SEPAR members dissect the Grab & Go kits to find out what make them work, next month we will work on problem diagnostics and kit set-up.

SEPAR will be doing an exercise with the Surrey Emergency Social Services (ESS) agency on Saturday April 28th to test our skills and to familiarize the ESS staff with our capacity to provide emergency communications when all 'normal' communications lines are down.

SEPAR is a part of the larger Surrey Emergency Program and we need to make our presence known as we do form a vital link in the program.

Please join the Tuesday Night SEPAR Net at 1930 hrs on 147.360 MHz Tone 110.9, SEPAR meets every third Thursday evening from 1900 - 2130 hrs at 13569 76th Avenue Surrey V3W 2W3 and every fourth Saturday morning at Fire hall #1 from 0900 -1200 hrs. More

information can be found at the SEPAR web site at <http://www.separs.net/>

SEPAR is always looking for new members to assist the community in times of emergency situations. SEPAR offers training in the Incident Command System (ICS), the use of radios during emergencies and the integration of SEPAR in the Emergency Operations Centre (EOC). If you are up to the challenge please contact me at va7kph@separs.net



(Continued from page 5)

tunability and choice of demodulation modes. The recording can also be analyzed for hidden signals and carriers.

MDSR and DRM

There is a [local connection](#) to SDR. Alex Schwarz (VE7DXW) is an advanced HAM and a graduate of the HTL, Innsbruck. He moved to Vancouver in 1990 and has since been involved in professional communication systems (LDR trunking) and digital point to point wireless network systems. In 2005 he started work in the Biomedical Engineering Department at C&W



Hospital in Vancouver. He can be reached through his email address: alexschwarz@telus.net.

What is exciting about this project is that SDR capability can be added to an existing HF transceiver with a small add-on circuit board. The output of the converter is fed to your computer soundcard using a female connector (on the backside of the receiver).

Currently several radios are supported including the [Yaesu FRT-100](#), [Ft-817](#) and [FT-897](#). The Icom IC-706 adaptation is under development. Alex will be the guest presenter at the next SARC meeting on February 8th and will provide an in-depth look at this technology.

This was only a sample of what is currently available (see also the FunCube Dongle on page 10). The next SARC meetings on SDR should be informative and interesting. We hope you can make it.

News You Can Lose The Lighter Side of Amateur Radio

A helping hand to move our big tower?

John VA7XB noticed this photo of a portable tower being transported by heavy-lift helicopter. Well... we had a man-lift at our last Field day! It could happen.



Ohms Law Watch

For the ham who has everything... TechNote Time's watch incorporates Ohm's law, Joule's law, resistor band color chart and more on the dial! It may be useful for you to have a handy reference for Ohm's Law and Joule's Law, for calculations, or for determining the values of resistors and capacitors according to the codes that appear on their casings. TechNote Time's watch is "handy" for geeks, hams, apprentices, electricians, technicians or anyone studying electricity/working with electronic circuits.



Morse Lives in Hollywood

Located in the center of Hollywood, near the intersection of Hollywood and Vine, stands a very recognizable landmark, a circular office building, the home of Capitol Records,



It was built in 1956 and has the distinction of being the world's first circular office building. The shape was chosen as it was more earthquake resistant and more efficient for heating and cooling.

Known as the 'Sound Capitol of the World', the building includes a sound-proofed chamber located 20 feet below ground designed by famed guitarist Les Paul. The first recordings made in the building were a series of

instrumentals by Frank Sinatra titled "Frank Sinatra Conducts Tone Poems of Color". Since then artists such as The Beatles, Beach Boys, Tina Turner, Steve Miller, Bonnie Raitt and others have recorded there.

Of interest to hams is the spire atop the building. It has a red light at the peak to comply with federal airline safety regulations. It blinks the word 'Hollywood' in Morse Code. In fact, the light's initial activation on April 6, 1956 was ceremoniously conducted by Leila Morse, granddaughter of Samuel Morse.

Only once in the building's 50 year history was the message changed. This occurred in 1992 when Capitol records celebrated 50 years in business. For the occasion the red light blinked 'Capitol 50' in Morse.

They were leading a priest, a drunkard and an engineer to the guillotine

They asked the priest if he wanted to face up or down when he meets his fate. The priest said that he would like to face up so that he will be looking toward heaven when he dies. They raise the blade of the guillotine, release it, it comes speeding down and suddenly stops just inches from his throat. The authorities take this as divine intervention and release the priest.

Next the drunkard comes to the guillotine. He also decides to die face up hoping that he will be as fortunate as the priest. They raise the blade of the guillotine, release it, it comes speeding down and suddenly stops just inches from his throat. So they release the drunkard as well.

The engineer is next. He too, decides to die facing up. They slowly raise the blade of the guillotine, when suddenly the engineer says, "Hey, I think the problem is that the cable is binding right here...."





Tech Talk John Schouten VE7TI

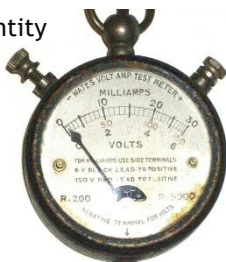
Multimeters

I'm sometimes surprised when a fellow ham asks a troubleshooting question and they have no knowledge of simple voltage, current or resistance measurement. When instructing the Basic course I used to spend a fair bit of time on series and parallel circuits and the means to make basic measurements, and there are several questions in the question bank that test these skills. I use my multimeter several times a week, to check for a short, open circuit or even whether a dry cell battery requires replacement. This month we'll look at the meters themselves... next month the basics of how to use them.

Multimeters or multitesters, also known as a VOM (Volt Ohm Meter) is an electronic measuring instrument that combines several measurement functions in one unit. They are inexpensive and very handy tools for measuring what is going on in a circuit and will offer Voltage, Current and Resistance ranges adequate for home use. Most new multimeters are digital. Until recently, digital multimeters were expensive, and some lab quality instruments still are, as much as \$5,000. For as little as \$10 you can purchase one on-line or on sale at Canadian Tire. The average home user can get by with a basic model.

History

The first moving-pointer current-detecting device was the galvanometer in 1820. These were used to measure resistance and voltage by using a resistor bridge, and comparing the unknown quantity to a reference voltage or resistance. While useful in the lab, the devices were very slow and impractical in the field. These galvanometers were bulky and delicate. By adding a series or shunt resistor, more than one range of voltage or current could be measured with one movement.



Multimeters were invented in the early 1920s as radio receivers and other vacuum tube electronic devices became more common. The invention of the first multimeter is attributed to British Post Office engineer, Donald Macadie, who became dissatisfied with having to carry many separate instruments required for the maintenance of the telecommunications circuits. Macadie invented an instrument which could measure amperes, volts and ohms, so the multifunctional meter was then named Avometer. The meter comprised a moving coil meter, voltage and precision resistors, and switches and sockets to select the range.

Any meter will load the circuit under test to some extent. For example, a microammeter with full-scale current of 50 microamps, the highest sensitivity commonly available, must draw at least 50 microamps from the circuit under test to deflect fully. This may load a high-impedance circuit so much as to affect the circuit, and thereby give a false low reading.

To eliminate loading, Vacuum Tube Voltmeters (VTVM) were used for voltage measurements in electronic circuits. The VTVM had a fixed input impedance of typically 1 megohm or more, usually through use of a vacuum tube input circuit, and thus did not significantly load the circuit being tested. Modern digital meters and some modern analog meters use electronic input circuitry to achieve high-input impedance—their voltage ranges are functionally equivalent to VTVMs.

Before the introduction of digital electronic high-impedance analog transistor and field effect transistor (FETs), vacuum tubes were commonly used.



How Does It Work?

An un-amplified *analog* multimeter combines a meter movement, range resistors and switches. For an analog meter movement, DC voltage is measured with an internal series resistor connected between the meter movement and the circuit under test. If no resistors were used, the excessive voltage or current would quickly burn out the small wires that make up the meter coil. A set of switches allows greater resistance to be inserted for higher voltage ranges. As an example, a meter movement that required 1 milliamp for full scale deflection, with an internal resistance of 500 ohms, would, on a 10-volt range of the multimeter, require 9,500 ohms of series resistance. Why? Remember Ohms Law, $R = E / I$ or 10 volts divided by .001 amp which equals 10,000 ohms. The meter has an internal resistance of 500 ohms so we must add series resistance of 9,500 ohms to obtain a full scale reading.



An analog multimeter. Note the scales used for voltage, current and resistance readings. The needle swings proportionately to the right, activated by a current passing through a small electro-magnetic coil. The mirror between the scales is used to line up the needle to avoid parallax errors caused by looking at the indication on the scale at an angle.

Now any voltage between 0 and 10 volts will produce some proportional deflection of the meter and this value can be read from the scale.

For analog current ranges, low-resistance shunts are connected in parallel with the meter movement to divert most of the current around the coil. Again for the case of a hypothetical 1 mA, 500 ohm movement on a 1 Ampere range, the shunt resistance would be just over 0.5 ohms.

Moving coil instruments respond only to the average value of the current through them. To measure alternating current, a rectifier diode is inserted in the circuit so that the average value of current is non-zero.

To measure resistance, a small dry cell within the instrument passes a current through the device under test and the meter coil. Since the current available depends on the state of charge of the dry cell, an analog multimeter usually has an adjustment for the ohms scale to zero it, to compensate for the varying voltage of the meter battery. In the usual circuit found in analog multimeters, the meter deflection is inversely proportional to the resistance; so full-scale is 0 ohms, and high resistance corresponds to smaller deflections. The ohms scale is compressed, so resolution is better at lower resistance values. Inexpensive analog meters may have only a single resistance scale, seriously restricting the range of precise measurements.

Resolution of analog multimeters is limited by the width of the scale pointer, parallax, vibration of the pointer, the accuracy of printing of scales, zero calibration, number of ranges, and errors due to non-horizontal use of the mechanical display. Accuracy of readings obtained is also often compromised by miscounting division markings, errors in mental arithmetic, parallax observation errors, and less than perfect eyesight. Mirrored scales and larger meter movements are used to improve resolution; two and a half to three digits equivalent resolution is usual and adequate for the limited precision needed for most measurements.

Analog meter movements are inherently much more fragile physically and electrically than digital meters. Many analog meters have been instantly broken by connecting to the wrong point in a circuit, or while on the wrong range, or by dropping onto the floor.

On the favourable side, Analog meters are able to display a changing reading in real time, whereas digital meters present such data in a manner that's either hard to follow or more often incomprehensible. Also a digital display can follow changes far more slowly than an analog movement, so often fails to show what's going on clearly.

Analog meters are also useful in situations where it's necessary to pay attention to something other than the meter, and the swing of the pointer can be seen without looking at it. This can happen when accessing awkward locations, or when working on cramped live circuitry.

Analog displays are also used to very roughly read currents well above the maximum rated current of the meter. For this, the probes are just touched to the circuit momentarily, and how fast the pointer speeds towards full-scale deflection

is noted. This is often done when testing state of charge of dry batteries.

The ARRL handbook also says that analog multimeters, with no electronic circuitry, are less susceptible to radio frequency interference, important if working on radio gear.

Digital Meters

The first digital multimeter was manufactured in 1955 by Non Linear Systems. Modern multimeters are often digital due to their accuracy, durability and extra features. In a digital multimeter the signal under test is converted to a voltage and an amplifier with electronically controlled gain preconditions the signal. A digital multimeter displays the quantity measured as a number, which eliminates mechanical errors.

Measurement enhancements available include:

Auto-ranging, which selects the correct range for the quantity under test so that the most significant digits are shown. For example, a four-digit multimeter would automatically select an appropriate range to display 1.234 instead of 0.012, or overloading. Auto-ranging meters may include a facility to 'freeze' the meter to a particular range, because a measurement that causes frequent range changes is distracting to the user. Other factors being equal, an auto-ranging meter will have more circuitry than an equivalent, non-auto-ranging meter, and so will be more costly, but will be more convenient to use. An other reason to 'freeze' the range is that this somewhat avoids 'hunting' which is a situation where the meter continuously switches between two neighbouring ranges as when the instrument is in the low range, the value is too large but too small in the larger range.

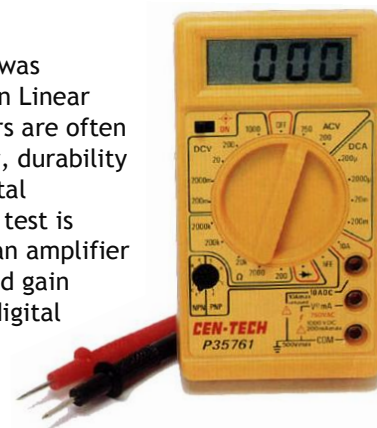
Auto-polarity for direct-current readings, shows if the applied voltage is positive (agrees with meter lead labels) or negative (opposite polarity to meter leads).

Sample and hold, which will latch the most recent reading for examination after the instrument is removed from the circuit under test.

Current-limited tests for voltage drop across semiconductor junctions. While not a replacement for a transistor tester, this facilitates testing diodes and a variety of transistor types.

As you can see, not all meters are created equally and the choice depends upon your needs. For general home use however, a \$10 digital multimeter will accomplish most tasks with the least possibility of damage to the circuit or the meter.

Next month we'll continue our look at the multimeter and examine some common measurements and tips on their use in your home and shack.



'Net' Working Internet Resources and Tidbits for Hams

Inflatable Tower



Always wanted a tower but no permanent room? Here's the answer:

ltaprojects.com/ham.html



[Watch the Video](#)

Hopefully there are no kids with sharp objects around or your QSO will be deflated.

Video of 6 year old Radio Ham on David Letterman Show

Six year old radio ham Veronica Harrington KC6TQR appeared on the David Letterman TV show a month after getting her license in 1993.

David Letterman interviewed 6-year-old Veronica Harrington, KC6TQR, of Long Beach California, who was visiting New York City in 1993. During the interview Veronica demonstrates the use of one of two radios set up on David Letterman's desk and has a contact with Jeanne Myers, ex-N2OVO (now AA2NK) of Brooklyn. It is understood that Veronica was 5 when she passed her Technician exam. [Watch the video David Letterman Show 1993](#) and [Veronica, a bit older, in 2009](#).

Ham Radio Tutorial - How to set SSB Gain Control

In this video Tyler Pattison N7TFP shows you how to properly set your microphone gain when operating SSB.

[Watch Ham Radio Tutorial - How to set SSB Gain Control](#)

Ham Radio Tutorial - HF Radio Wave Propagation

In this video Tyler Pattison N7TFP explains how radio waves travel around the world via radio 'skip' or sky-wave propagation.

[Watch Ham Radio Tutorial - HF Radio Wave Propagation](#)

Technique of Hand Sent Morse Code

A 1944 Department of Defense movie shows how to correctly send Morse Code.

[Watch Technique of Hand Sending \(1944\)](#)

43 years of 73 Magazine on web

PDF's of all issues of the popular Amateur Radio publication 73 Magazine produced by Wayne Green W2NSD from 1960-2003 are available for download.

A popular part of the magazine was Wayne Green W2NSD's 'Never Say Die' column. In it he gave his views on just about everything. All the 73 Magazine PDF's can be downloaded from: tinyurl.com/73Magazine

WinDRM File Transfer video

Free [WinDRM](#) software allows data transfer data at almost 1KB/s without using proprietary hardware! Text files, photos, executables or any other format can be exchanged with station running the software.

Tony K2MO has produced a short video that illustrates how the free WinDRM software can be used to transfer files. The process can be automated by selecting the TX/RX ARQ and automatic BSR settings. The modem is 2K wide so use in the appropriate band segments.

[Watch WinDRM File Transfer on YouTube](#)

Funcube Dongle



The [FUNcube Dongle](#) is the "ground segment", or a radio receiver designed to allow anyone to try their hand at reception of satellites anywhere on Earth. There are two versions. The entry level FUNcube Dongle gives access to the satellite frequency band that FUNcube and some other satellites use. The Pro version gives unlimited access to the frequency range 64 to 1,700MHz.

It's also all-mode: this means that it's not just limited to narrow band FM reception. As well as data, the FUNcube Dongle will also receive many other narrow band signals including AM, FM and SSB. It will even receive TV sound channels!



QRM ...from the Editor's shack

*Do you have a photo or bit of club news to share?
Something to sell or something you are looking for?
Email it to ve7ti@separ.net for inclusion in this column.*

Another Surrey Club?

I happened upon another Surrey Amateur Radio Club recently while surfing the Net. This one is known as the Surrey Radio Contact Club ([SRCC](#)) and it is located in Croydon in South London. The club has a membership of over 60 and meets twice a month at a local school.

Annual dues are £8.00, which includes a monthly Newsletter. Their 1st meeting of the month is the main meeting when they have visiting speakers, surplus equipment sales, construction contests, etc. The 2nd meeting of the month ("B" meeting) is a lot more informal forming a so-called 'natter' night, fix-it evening, and "Move-It-On" which, I presume is an opportunity to move-on equipment no longer wanted.



Other activities include attendance at the twice yearly Kempton Rallies, VHF NFD contest every July, Special Event stations, other contests, and an Annual Club Dinner.

The SRCC's Web site has copies of their newsletter and details of forthcoming meetings. Their meetings sound very interesting with much emphasis on kits and projects. The newsletters are also filled with informative articles and I recommend browsing through a few.

Intrigued, I sent an email to their President and received an immediate reply. I learned that 'Surrey' derives from the Saxon 'Sudergeona' or 'Suthrige' (southern district or region), of the Kingdom of the Middle Saxons. The northern district became the county of Middlesex.

We have discussed the possibility of setting up some type of liaison, initially with an attempt at HF contact and otherwise via Echolink. Stay tuned for further developments.

Danish Hams Plan To Cross Northwest Passage

Kjeld VE7GP has a couple of Danish sailor friends, that are going to attempt to cross the North West passages this summer from Alaska to Greenland, starting in May. You can follow them at www.sy-sol.dk



Their names are Kim and Kirsten. He is a Danish ham OZ1MAL. Kjeld has had many contacts with Kim over almost 20 Years since they have been sailing. Kjeld says: "When I heard about it from them in their Christmas letter, i decided

to suggest to SARC that we make it a club project to try to stay in contact with them. The idea was well accepted at the meeting. We don't have any frequencies yet. There boat's name is "SOL" The boat is already in Cordova, Alaska, and doing fine in all the snow they have up there."

Kjeld will keep us informed, when he gets more news.



Gear For Sale

Dino is selling the following equipment for a Ham friend who is recovering from a Hospital stay and does not have Internet.

1. FT1000D - 200W (second owner), fully loaded. Small scratches on top, 9 out of 10, comes in original dual boxes - \$1600
2. FT1000MP Mark V Field - 100W, (original owner), built in tuner and power supply. No scratches, 9,5 out of 10, comes with extra Inrad filters #714 and #711, manual. - \$1600
3. FT857D - 100W all mode, HF +2M +70cm (original owner). No scratches, 9.5 out of 10, it comes with MH-59 and MH-31 mic's , original box, manual, mobile bracket and external speaker. - \$580
4. FT7800R dual band mobile, 2m and 70 cm (original owner), .5 out of 10. It comes with original box, manual , separation kit, mobile bracket MH-48 mic. - \$240
5. Kenwood TS 440S radio, comes with TS-430 matching power supply, it has some scratches , 7 out of 10, Dynamic Kenwood mic, - \$500
6. RF concept RFC 2-417 - 2M 170W amp with built in preamp - \$200
7. Astron RS-35A power supply - \$120
8. Tigertronics Signalink SL-1+ - (original owner) , original box and CD - \$50

Dino VE7XDT
E-mail: ve7xdt@rac.ca
Tel: 604-787-1224

Desert 'RATS-Fest'

For the past two years, the Desert Radio Amateur Transmitting Society (aka D-RATS) has staged an outdoor Ham Fest in Palm Springs, California on the last weekend of January. Located in the Coachella Valley, Palm Springs offers warm winter temperatures in a desert climate that draws "Snowbirds" from many northern states and Canada. VE 6's and 7's were spotted, as a matter of fact, the President of Desert RATS is Peter VE7REZ. There were seminars, many vendors and some good buys. Similar to SARC, D-RATS is an active club with approximately the same membership. They sponsor a repeater located atop a nearby hill.



SARC Name Badges

It is time to place another order for SARC name badges. Cost is \$10 per badge. If you are in the current ham class and don't yet have a callsign, we will ask you again after graduation day.



This is what they look like... dark blue lettering on white background, with a pin on the reverse side.

If you would like one, please let Scott VE7HA know about it. We must receive payment in advance before the order is placed, so I suggest you bring \$10 to the next SARC meeting and indicate the name and call sign that you wish to appear on the badge.

Alternatively, you can send a cheque with the required information (name and callsign) to:

Scott Hawrelak
13935 80A Ave. Surrey, BC
V3W 6P5

We will place the order on or around Feb. 9th, after the next SARC general meeting.

The SARC Calendar ...all about the Amateur Radio month ahead in Surrey

FEBRUARY 2012						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2 Ham Class	3 SARC Breakfast 8:30 ABC Restaurant 74 th & King George Blvd	4 Contest: BC QSO Party—all modes
5 Contest: BC QSO Party 1916: Alexanderson successfully tests multiple tuned antenna	6	7 SEPAR NET 7:30 SARC NET 8:00	8 SARC Meeting 7:00	9 Ham Class	10 SARC Breakfast 8:30 ABC Restaurant 74 th & King George Blvd	11 Contest: CQ WW RTTY WPX RTTY
12 Contest: CQ WW RTTY WPX	13	14 SEPAR NET 7:30 SARC NET 8:00 	15	16 Ham Class	17 SARC Breakfast 8:30 ABC Restaurant 74 th & King George Blvd	18 ARRL Intl DX CW
19 ARRL Intl DX CW 1975: Harris introduces the first solid-state radio transmitter	20 1920: B'day of Graham Spry, Canadian radio pioneer 	21 SEPAR NET 7:30 SARC NET 8:00	22 SARC Exec Mtg. 7:00 1857 B'day of H.Hertz, 1st to broadcast & receive radio waves 	23 Ham Class 1910: 1st radio contest held (Philadelphia)	24 SARC Breakfast 8:30 ABC Restaurant 74 th & King George Blvd	25 NA QSO Party (RTTY)
26 NA QSO Party (RTTY) Burnaby ARC Flea Market 	27	28 SEPAR NET 7:30 SARC NET 8:00	29	For details on all SARC events, go to ve7sar.net For details on all SEPARS events, go to separs.net		

Contest Details: <http://hornucopia.com/contestcal/contestcal.html>



QRT John Brodie VA7XB

Visions, Values, Purpose, Objectives

The Executive will soon be wrestling with the question “Where is SARC Going?” In the lexicon of “strategic planning” the “Purpose” of our organization is intertwined with the related concepts of “mission, visions, values, goals and objectives”. We can start the discussion by turning to our Constitution, which says our Purpose is:

- *To promote and encourage interest and activities associated with amateur radio*
- *To assist the Community in the event of an emergency or wherever communications may be required*

We might say that the first part of the “Purpose” is the primary focus of SARC, and the second or EmComm function is the primary focus of SEPARS, reflecting the fact that historically the two groups did not exist as separate entities. The relative responsibilities of SARC and SEPARS are spelled out in a Memorandum of Agreement, which appears on our website but, in fact, both groups share both purposes, though the emphasis is different. I see no fundamental reason to change SARC’s “Purpose”.

It may be an appropriate time to consider some specific objectives that will help us fulfill our constitutional Purpose. So a few weeks back, I asked members of the Executive to provide their thoughts about club objectives for SARC’s 2012 calendar year and how they might support the Purpose as expressed by our Constitution. The benefit of having some specific objectives would appear to be self-evident with respect to our future success in promoting amateur radio, providing advancement to our members and service to the community. Objectives should be measurable, i.e. we should be able to know conclusively if we have achieved them or not. Some of the comments received were more in the line of “mission” or “vision” and not directly measurable, but amongst the input were several excellent goals, which we may consider, refine and formulate into a strategic plan.

Here is what one member had to say about the value of setting objectives: “Setting goals and objectives is a great motivator and keeps us from becoming apathetic and preventing stagnation, particularly if we also commit to reviewing our achievements, based on the goals we set, at the end of the year. Setting realistic goals also requires us to think about how we would achieve them, which would, hopefully, provide an opportunity to build teams and get commitments from an increasing number of Club members to participate and contribute. We may not meet our goals the first time, but at least it would be the start of a process that may well grow the Club in the longer term.”

Following is a compilation of suggestions received, which I have for convenience broken into general and measurable categories:

General Objectives

- Promote Amateur Radio - grow general interest in the hobby and knowledge of radio
- Encourage public service via Amateur Radio
- Grow members’ interest in HF, DX and contesting

- Collectively Elmer hams who need assistance to grow their knowledge and skills
- Share our stations with hams who do not have the equipment, but want to gain experience
- Support Ham Radio classes
- Increased participation (not just membership)
- Obtain some positive publicity
- Organize programs that will assist members in improving their skills, broadening their field of knowledge, and expanding the horizons of their participation in Amateur Radio and in SARC.
- Continually improve the Field Day operation in all areas: provisioning, deployment, functionality, operations, participation, etc.

Measurable Objectives

Administrative

- Develop a clear mission statement for the Club, formulate long-term goals, and develop both membership (internal) and public relations/marketing (external) plans for accomplishing those goals
- Create a manual reflecting the Club administrative function, documenting Executive roles, planning processes, schedules, tasks, methodologies, etc., packaged for ease of duplication and cross-training as members cycle through various roles

Repeaters

- Get our new 2m and 440repeater equipment installed and running at the new high-rise site.
- Put together an application for Lottery funds to allow us to purchase a 220 repeater and get it operational at the new repeater site.
- Work with SEPARS to get BC WARN installed and fully functioning at the new repeater site.

Licensing/Training/Field Day

- License at least 30 new amateurs annually through the basic ham class
- Promote the operator skills training program so that we have 6 operators fully trained and ready to make a competitive impact at Field Day.
- Double our Field Day score compared with last year
- Achieve one of the top 3 Canadian scores in any given contest
- Start a CW class and bring the rusty or beginning CW operators up to 10 wpm by June, with the further objective of having them proficient to 25 wpm by Field Day 2013.
- Secure a clubhouse and develop a plan to secure it as a long-term asset

Please consider the above comments as the basis for discussion at a future meeting. If you have some specific contributions to the foregoing, we would appreciate hearing from you. In the meantime, the Executive will be working on distilling those objectives that would form the key part of a strategic plan for SARC.